REPLACEMENT SHEET

FIG. 1

System Architecture

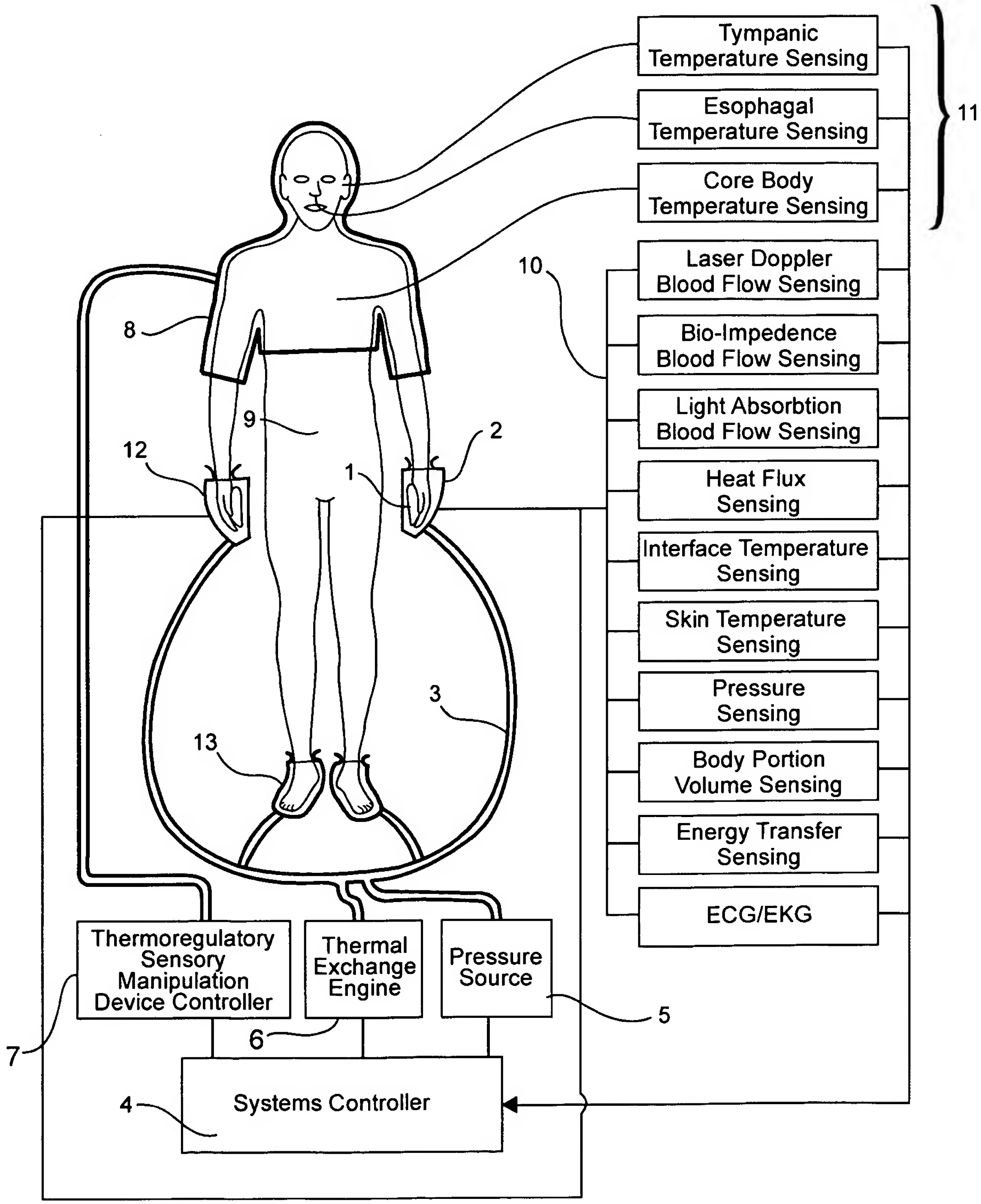
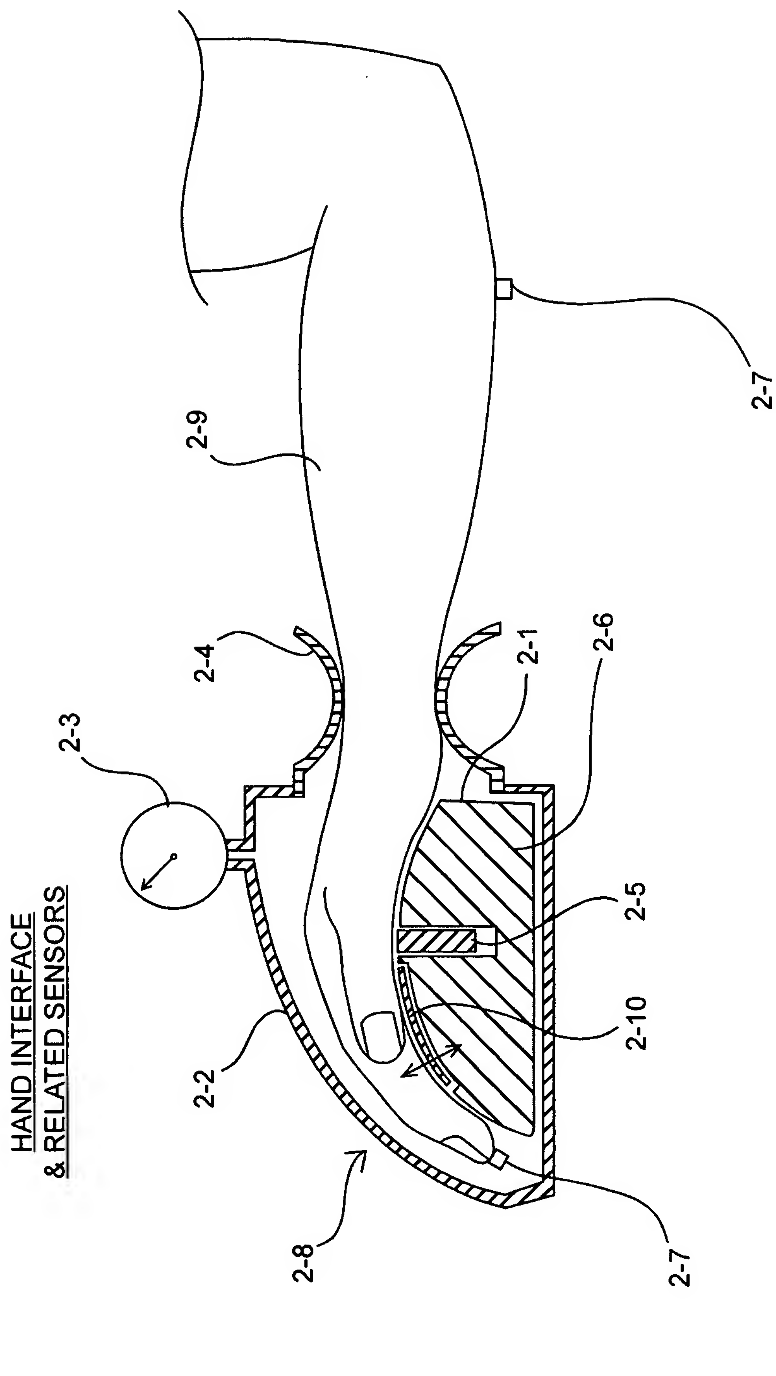


FIG. 2


HAND INTERFACE
& RELATED SENSORS
2-1
2-2
2-3
2-4
2-5
2-6
2-7
2-8
2-9
2-10
2-7

REPLACEMENT SHEET

FIG. 3

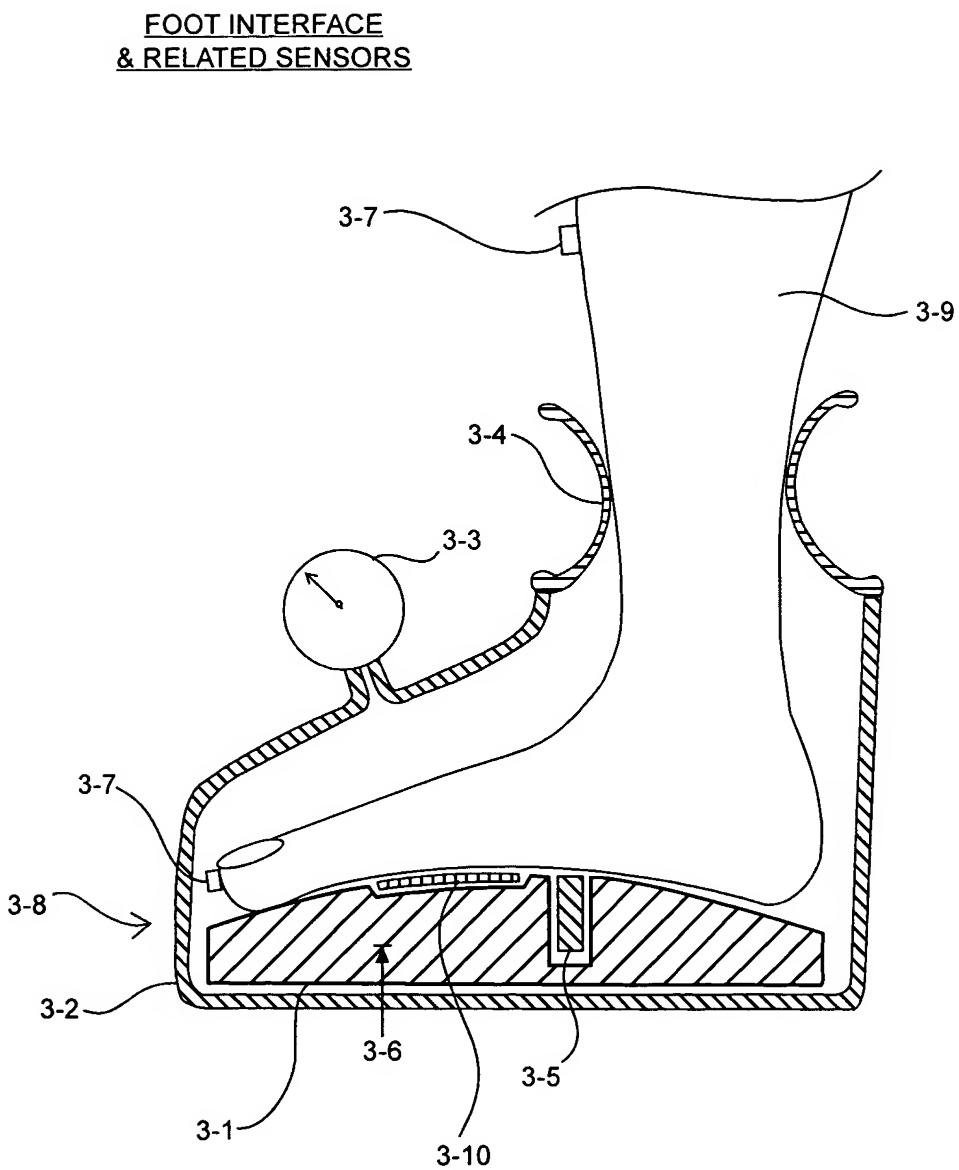


FIG. 4A

THE ENTIRE SKIN SURFACE

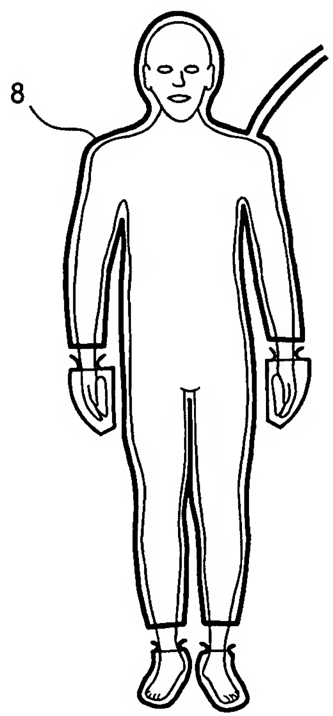
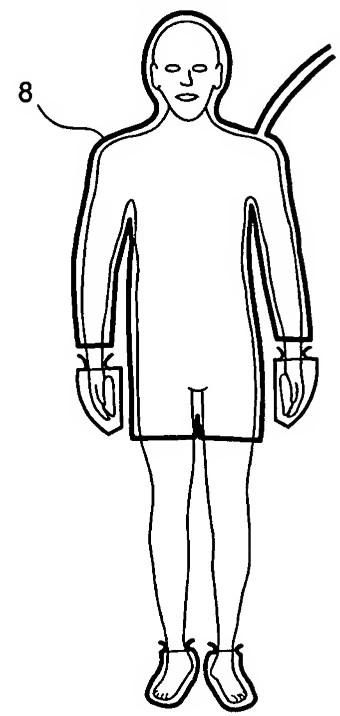


FIG. 4B

HEAD, SHOULDERS, CHEST, BACK, TORSO AND ARMS



REPLACEMENT SHEET

FIG. 4C

HEAD, SHOULDERS, CHEST, BACK AND ARMS

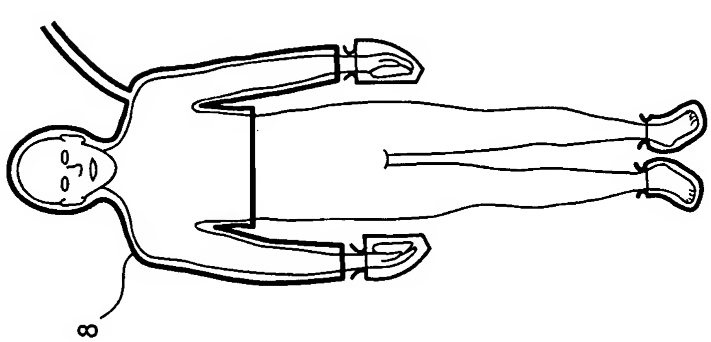


FIG. 4D

HEAD, SHOULDERS, CHEST AND BACK

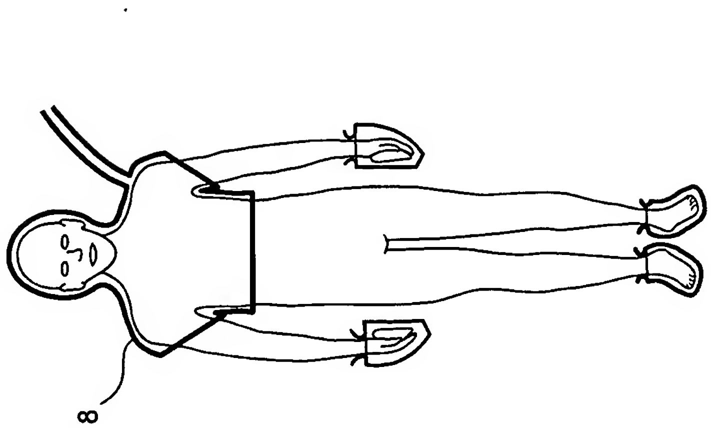


FIG. 4E

SHOULDERS, CHEST, BACK AND ARMS

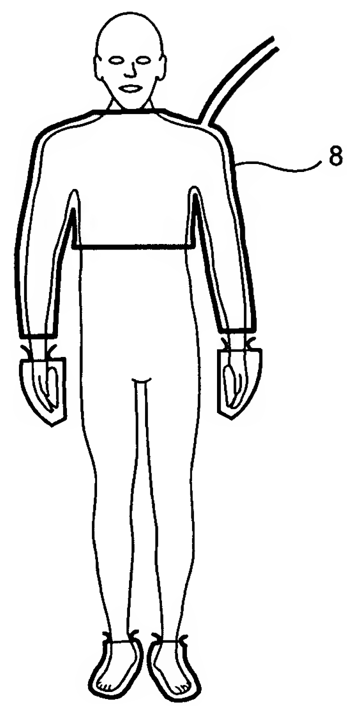


FIG. 4F

SHOULDERS, CHEST, BACK AND TORSO

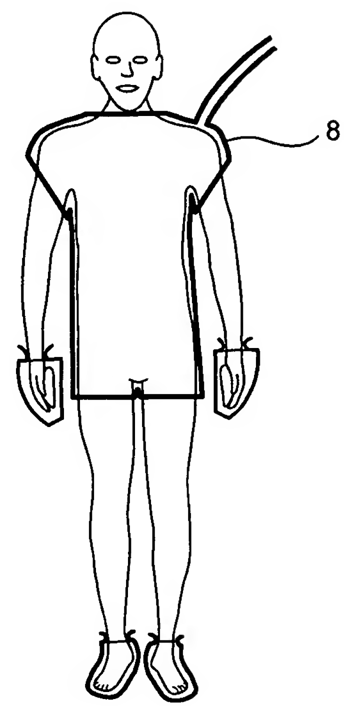


FIG. 4G

CHEST, BACK, TORSO AND LEGS

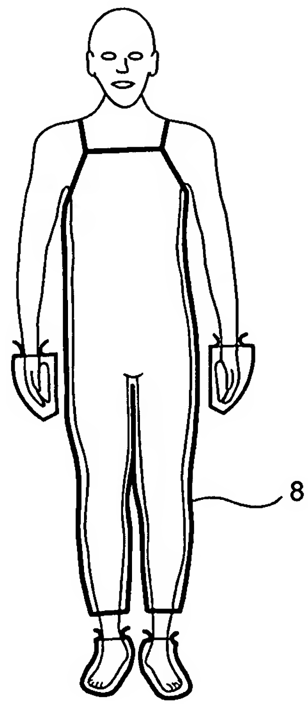


FIG. 4H

TORSO AND LEGS

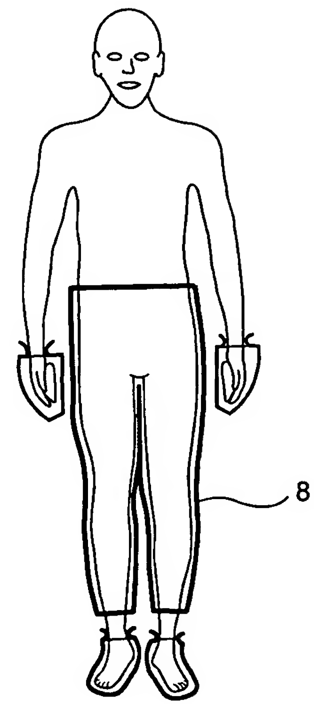


FIG. 5

Control Algorithm - Cooling

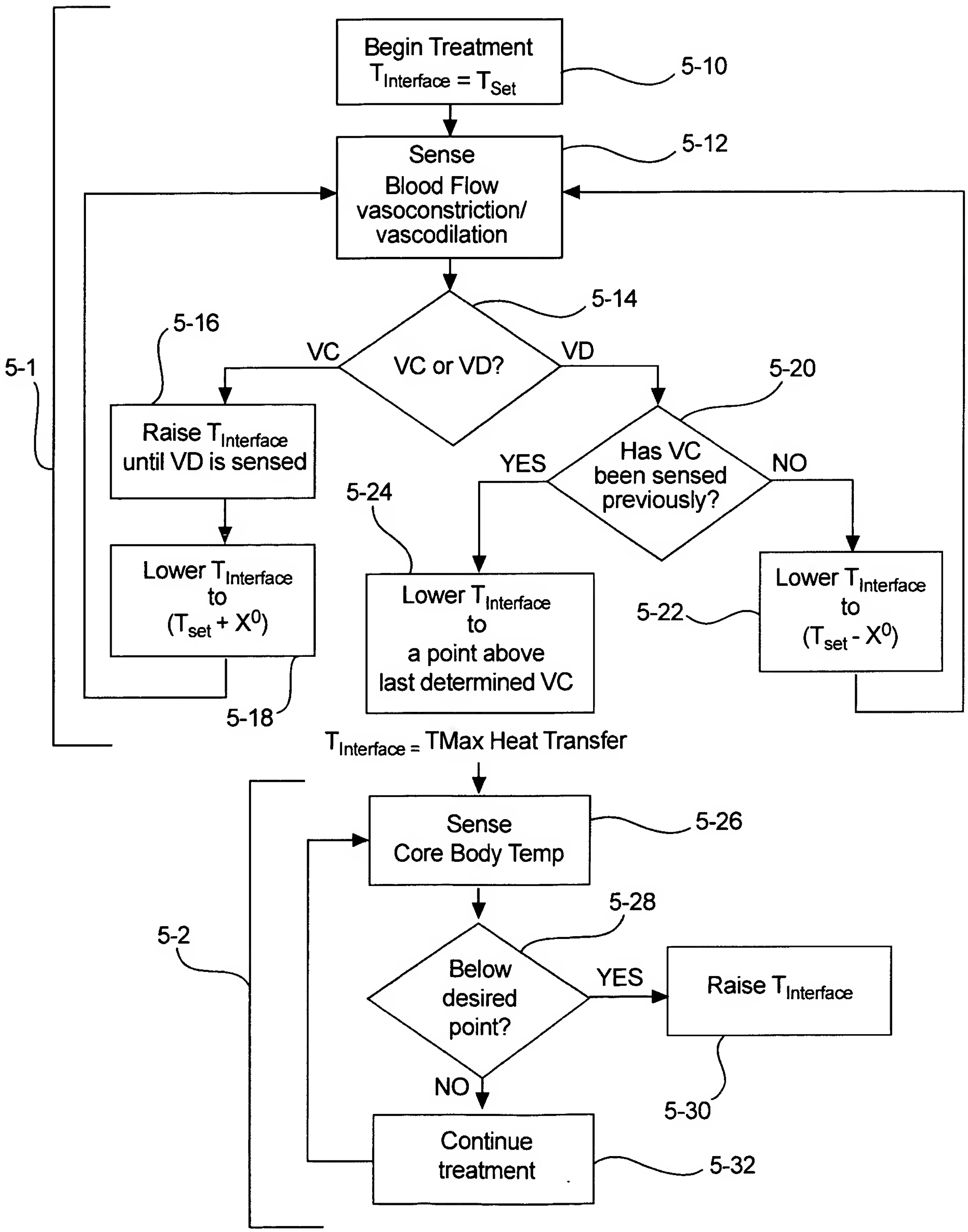
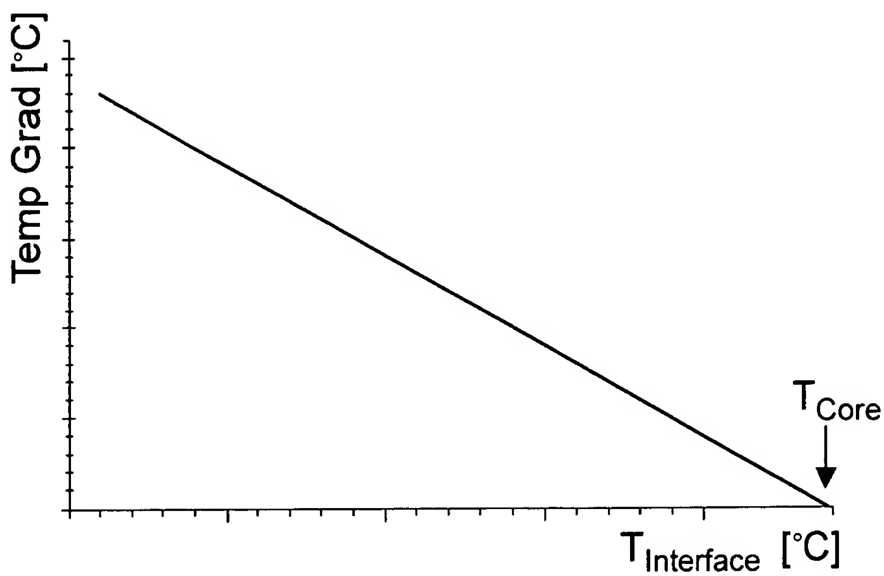


FIG. 6

$T_{Interface}$ affects Vasoconstriction & Vasodilation

Temperature Gradient
[Cooling]



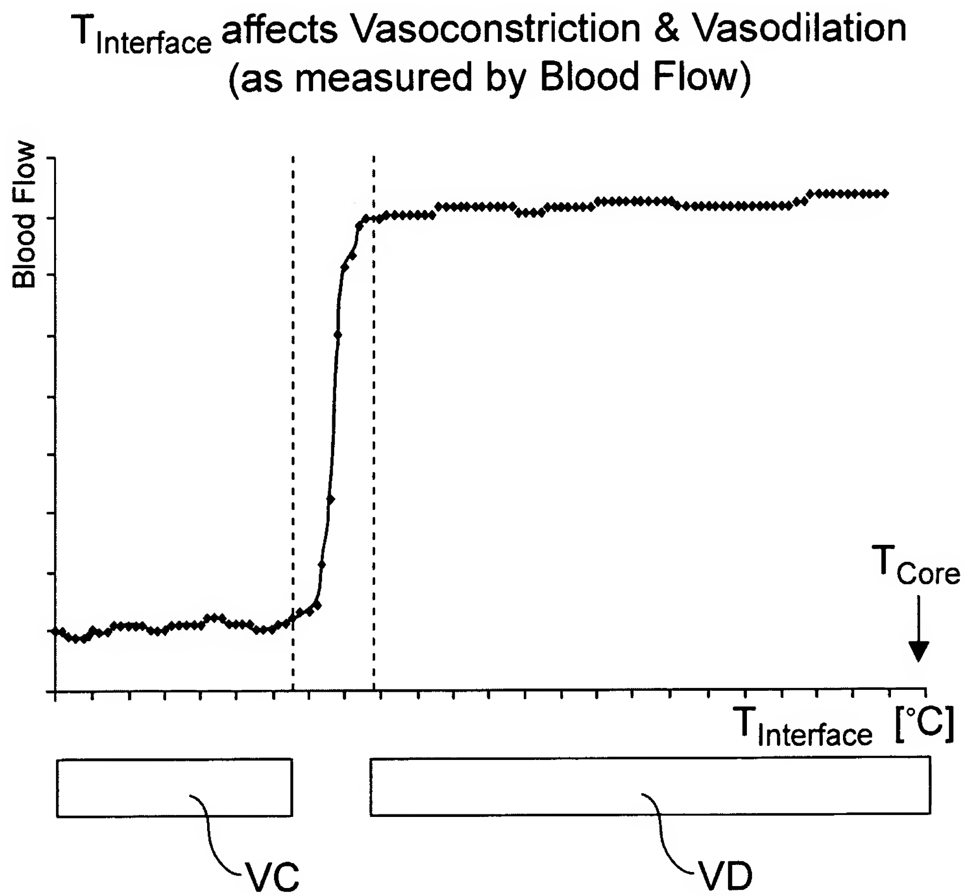
ΔT = Temperature Gradient $\equiv |T_{Core} - T_{Interface}|$

is the Driving Force in: Heat Transfer at the Thermal Interface

- Cooling: $T_{Interface} < T_{Core}$
- Warming: $T_{Interface} > T_{Core}$

REPLACEMENT SHEET

FIG. 7



For each individual,

•Vasoconstriction [VC] occurs below a certain Temp range

•Vasoconstriction [VD] occurs above that Temp range

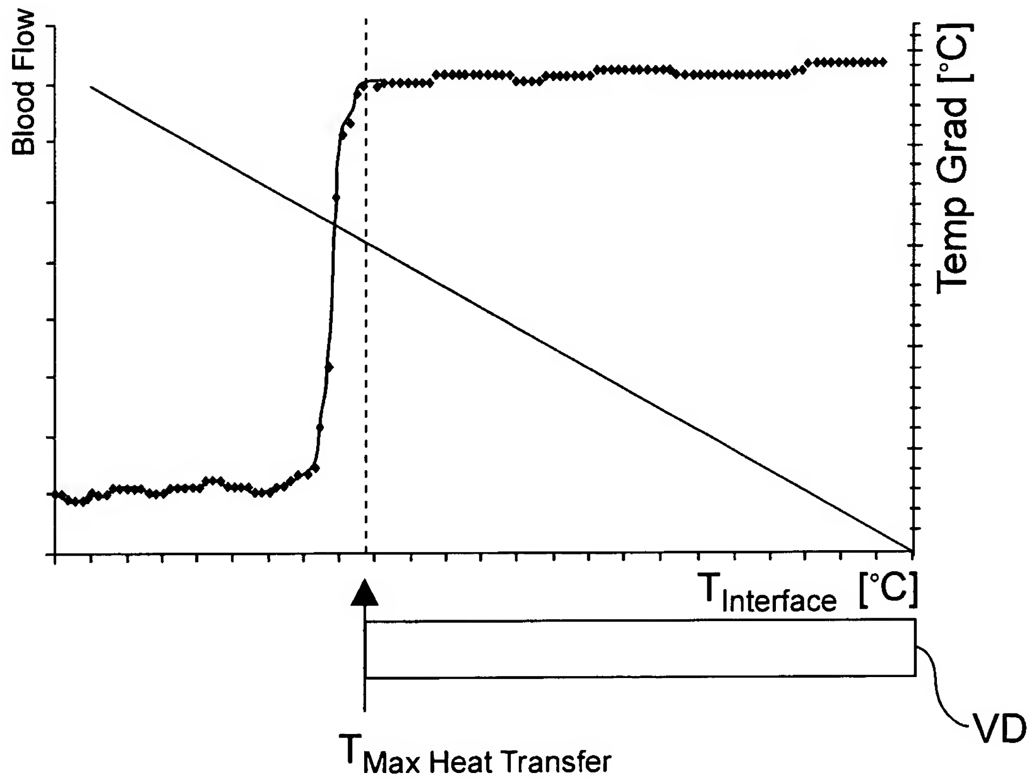
Blood Flow can be measured by:

- Laser Doppler
- Bio-Impedance
- Light Absorbtion (Pulse Oximetry)

REPLACEMENT SHEET

FIG. 8

Heat Transfer = *f* (Temp Grad x Blood Flow)
Figure shows Temp Grad & Blood Flow vs. $T_{Interface}$ superimposed

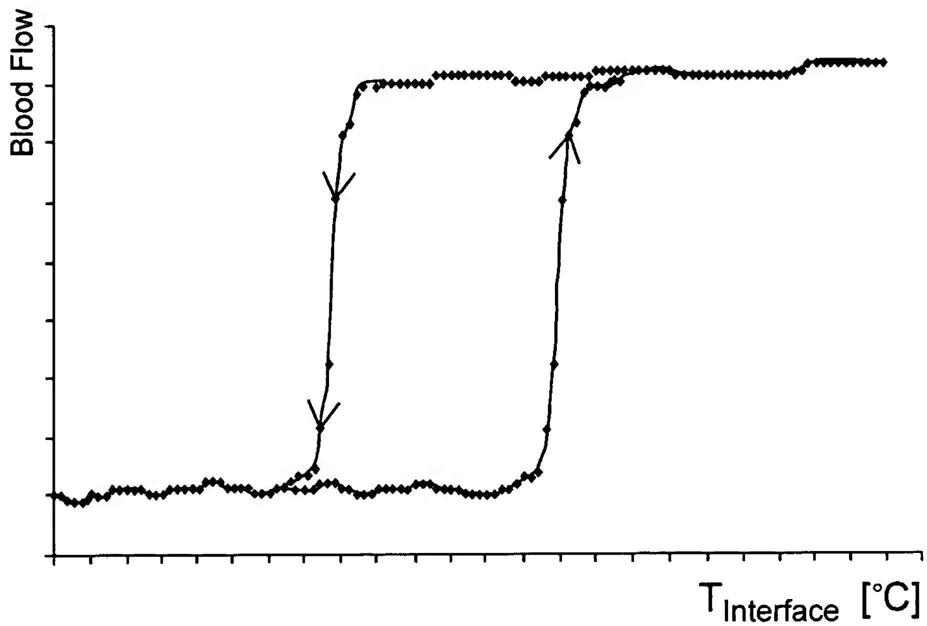


Maximum Heat Transfer
occurs @

The lowest $T_{Interface}$ where
Vasodilation occurs

FIG. 9

Hysterysis:



The transition between Vasoconstriction and Vasodilation is

NOT Identically Reversible...

The transition occurs at a different temperature range depending on the initial condition

Typically, the transition from:

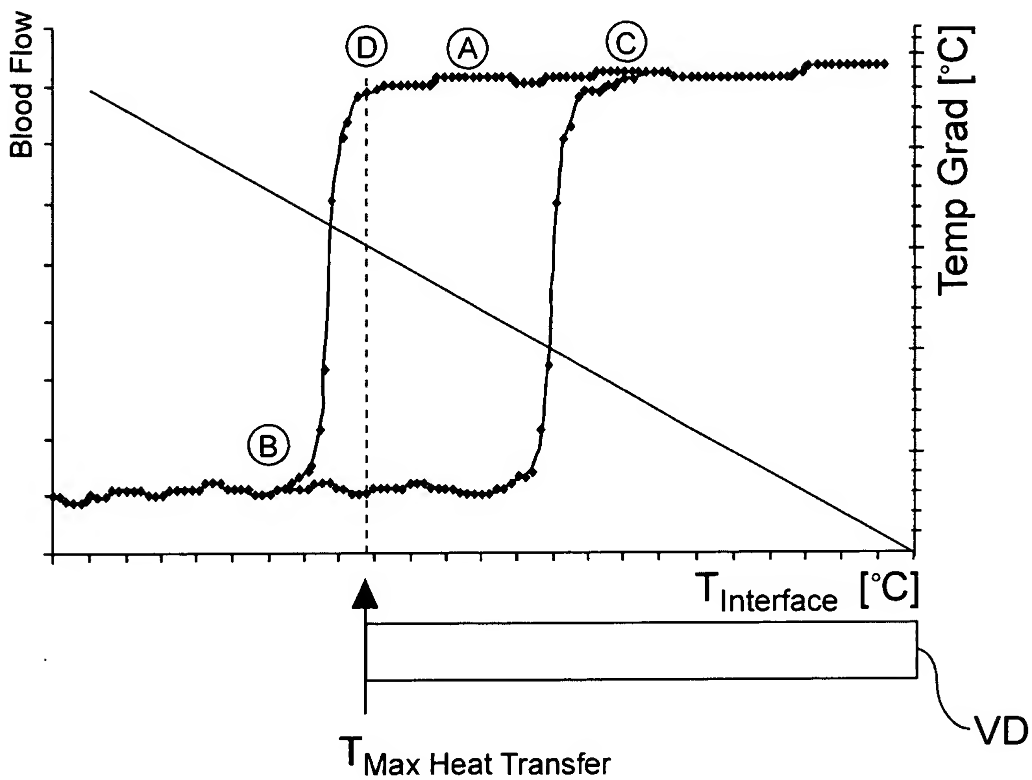
VC ⟶ VD

occurs at a $T_{Interface}$ range above

VD ⟶ VC

FIG. 10

If Vasodilation is initially detected



Ⓐ Blood Flow Sensor detects VD, $T_{Interface} = T_{set}$

Ⓑ System controller decreases $T_{Interface}$ until VC detected

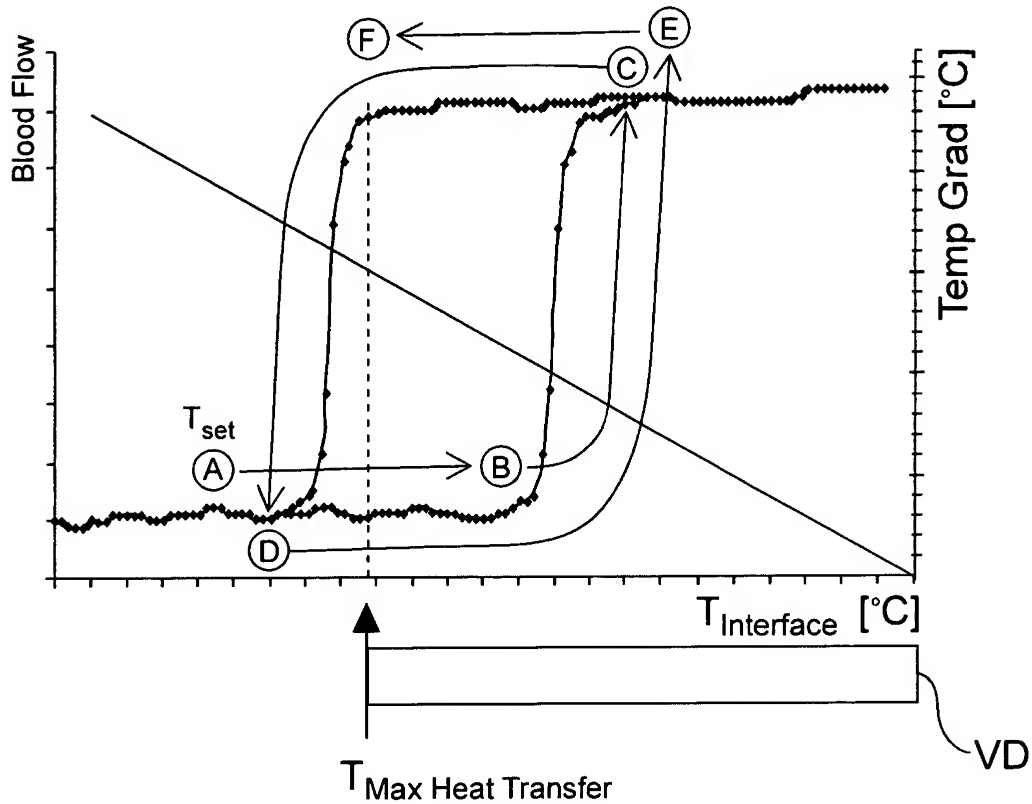
Ⓒ $T_{Interface}$ increases above transition temp range, VD occurs

Ⓓ System controller decreases $T_{Interface}$ to $T_{Max\ Heat\ Transfer}$

$T_{Max\ Heat\ Transfer} < T_{set}$

FIG. 11

If Vasoconstriction is initially detected



(A) Blood Flow Sensor detects VC, $T_{Interface} = T_{set}$

(B) System controller increases $T_{Interface}$

(C) $T_{Interface}$ increases above transition temp range, VD occurs

(D) System controller decreases $T_{Interface}$ to $T_{Max\ Heat\ Transfer}$

$T_{Max\ Heat\ Transfer} > T_{set}$